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# INSTRUCTIONAL DESIGN AND ASSESSMENT

## An Elective Course on Current Concepts in Adult Ambulatory Care

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**Objective.** To design and evaluate a doctor of pharmacy course exploring disease states commonly encountered in ambulatory care, while applying literature to clinical practice and promoting a continual learning mindset.

**Design.** This elective incorporated a learner-centered teaching approach. Each week, 2 groups of students were assigned a clinical trial to present to their peers. The focus was on clinical application and impact, rather than literature evaluation. A social networking group on Facebook was used to expose students to pharmacy information outside the classroom.

**Assessment.** Student grades were determined by multiple activities: presentations, participation and moderation of the Facebook group, class participation, quiz scores, and quiz question development. Course evaluations served as a qualitative assessment of student learning and perceptions, quizzes were the most objective assessment of student learning, and presentation evaluations were the most directed assessment of course goals.

**Conclusion.** This elective was an innovative approach to teaching ambulatory care that effectively filled a curricular void. Successful attainment of the primary course goals and objectives was demonstrated through course evaluations, surveys, and quiz and presentation scores.

**Keywords:** pharmacy education, ambulatory care, elective development

## INTRODUCTION

For more than a decade, ambulatory care has been a growing area of clinical pharmacy practice, and projections indicate a need for more than 165 000 pharmacists in this setting by 2020.[1] Even though some analyses suggest that the overall availability of pharmacist jobs is declining, leaving some recent graduates without an immediate career opportunity,[2] the need for ambulatory care pharmacists continues to be high.[3] The continual decline in the number of primary care physicians and the increasing health care needs of an aging population create a gap in primary care services that pharmacists are well positioned to fill.[4,5] The Center for Advancement of Pharmacy Education (CAPE) 2013 Educational Outcomes highlighted this opportunity for pharmacists and contained domains and objectives that apply directly to ambulatory care pharmacy practice (Domain 2: Essentials for Practice and Care; Domain 3: Approach to Practice and Care).[6] With 2 of the 4 domains described in the CAPE 2013 Outcomes focusing on objectives that pertain to ambulatory care pharmacy, it is clear that a greater emphasis is being placed on this component of pharmacy practice. As a result, colleges and schools of pharmacy must find a way to incorporate ambulatory care education into their curriculum.

The need for ambulatory care-focused education was historically met through the creation of elective courses. Multiple electives were developed that focused on specific topics such as diabetes,[7-11] anticoagulation management,[12,13] and cardiovascular disease.[14,15] Other electives encompassed ambulatory care concepts that may apply to multiple disease states but only focus on particular aspects such as lifestyle modifications[16-19]or management within the geriatric population.[20-22] Few ambulatory care or primary care electives described in the literature combined topics on a wide variety of disease states and other necessary ambulatory care clinical skills such as effective patient interviewing, careers and training in ambulatory care pharmacy, application of primary literature to patient care, etc.[23-26] The purpose of this paper is to describe an innovative elective course that covers a broad range of ambulatory care-related disease states, while incorporating patient care skills and fostering a mindset of continual learning.

## DESIGN

In 2011, an elective course called Current Concepts in Adult Ambulatory Care Pharmacy was developed for

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third professional year doctor of pharmacy (P3) students. The elective focused on multiple commonly encountered disease states in adult ambulatory care pharmacy practice such as diabetes, hypertension, cardiovascular risk reduction through obesity management, pulmonary disorders, anticoagulation (arterial and venous), and heart failure. The curriculum provided no class with as broad of a focus on ambulatory care topics as this elective would provide, nor had any class been taught using similar learning strategies and approaches. IRB exemption was received for the use of course surveys and evaluations.

The course was developed with 2 primary goals: (1) to increase student ability to apply relevant concepts from primary literature to clinical practice through the discussion and understanding of landmark trials relevant to ambulatory care pharmacy; and (2) to promote in a learner-directed manner a continual learning mindset outside of the classroom environment through the introduction of external pharmacy resources and primary literature.

Specific learning objectives were developed to achieve these goals including development of techniques for critical evaluation and effective presentation of ambulatory care pharmacy literature, identification of relevant literature and guidelines used to support or refute currently accepted practice in ambulatory care, and identification of effective strategies for patient interview and promotion of medication adherence (see Table 1 for all learning objectives). The course objectives were intended to address multiple levels of Bloom's Taxonomy ranging from comprehension to synthesis and evaluation.

This elective was designed as a 2-credit hour course that met for 2 hours, once per week at a college of pharmacy located on a single campus. It was only offered during the fall semester and had a capacity of 30 students. The course schedule was designed to ensure students had already completed the pharmacotherapeutic content areas that corresponded with the ambulatory care disease state topics covered in this elective, and all students completed a Principles of Drug Information and Literature Evaluation course during their P2 year. A learner-centered teaching approach was incorporated to achieve the goal of increasing student ability to apply relevant concepts from primary literature to clinical practice. Two groups of 2 to 3 students were each assigned a landmark clinical trial relating to an ambulatory care pharmacy topic and asked to present this to their peers for 10 of the 15 semester meetings. The presentations focused on the clinical application of the trial and its impact on clinical practice, rather than on the evaluation of the literature article, as would be expected in a drug information course. The majority of the presentation was expected to focus on clinical application, rather than trial design. At least 1 faculty member was present to facilitate discussion and add clinical experience and insight to the student-led presentation. A 75-point presentation grading rubric was used to evaluate each group, and the rubric was available to students on the course Blackboard Learn website at the beginning of the semester. Each student in the group received the same grade for the presentation, with up to 30 points for presentation content and clinical application of material, up to 20 points for article evaluation skills, up to 15 points for presentation style, and an additional 10 points for the group's ability to answer questions. Each group was required to create a 1- to 2-page summary of the article for other students to access on the course website following the class. Presenting students were tasked with creating 5 multiple-choice questions for a start-of-class quiz to help ensure adequate participation and discussion. All groups had the responsibility of presenting 2 articles during the semester.

Each student-led class session began with the quiz covering 2 articles to be discussed that day. The intent of the quiz was to assess whether students read the assigned articles prior to class and to test a baseline understanding of article content. Student groups presented their prepared material following the quiz. Groups were encouraged to incorporate unique and creative presentation and discussion methods and were evaluated on their ability to

Table 1. Current Concepts in Adult Ambulatory Care Pharmacy Course Learning Objectives

| |
|---|
| 1. List 10 disease states commonly treated in ambulatory care pharmacy* |
| 2. Identify relevant literature and guidelines used to support or refute currently accepted practice in ambulatory care |
| 3. Develop techniques for critical evaluation and effective presentation of ambulatory care pharmacy literature |
| 4. Proactively participate and interact during in-class discussion* |
| 5. Proactively participate and interact within the online social networking group* |
| 6. Promote the development of continual professional development through the use of an online social networking group and the identification of relevant external resources |
| 7. Identify effective strategies for patient interviewing and the promotion of medication adherence* |
| 8. Discover training and career opportunities available in ambulatory care pharmacy |

*Not directly assessed via course evaluations

engage the audience. Student-led discussions typically ranged from 30 to 45 minutes each. A patient case was discussed for the remainder of the class period. Students were "introduced" to the patient during the first class session and followed her medical care throughout the semester. Each week, the plan of care was updated based on additional patient case information. The faculty member present for each class facilitated patient case discussions. The development of a single, evolving patient case used during the entire semester (vs a different patient each week) was meant to represent the long-term care ambulatory care pharmacists provide to their patients.

The required activities addressing the second primary course goal of developing and promoting a mindset of continual learning among students were completed entirely outside of scheduled class time. This external learning was meant to represent the education that must be completed by pharmacists outside of their daily job responsibilities. A social networking group on Facebook was used as a means to expose students to new or up-to-date pharmacy information. At the start of the semester, students were informed that participation in the Facebook group was a mandatory component of the elective. They were given information regarding the anticipated time commitment outside of class, as well as a list of ways they could stay up-to-date on new pharmacy information. Participation in the Facebook group accounted for up to 100 points of students' final grades for the semester. Details of the Facebook group, including specific student roles, responsibilities, and expectations were described in a previous paper.[27]

Course coordinators spent the first class session discussing the syllabus and expectations. The use of Facebook and social networking was also discussed, along with suggestions on how to stay up-to-date with pharmacy literature and how to write effective quiz questions. All student questions and concerns regarding the syllabus were addressed as they arose.

Eleven of 15 class sessions focused on primary literature discussion and clinical application of the material to pharmacy practice (Table 2). Therapeutic topics discussed included diabetes, hypertension, asthma, and obesity. Course coordinators identified landmark trials that influenced current therapeutic guidelines, or other published trials impacting clinical practice prior to each semester. Articles discussed during the most recent course offering are shown in Table 3. Course coordinators led the first article-based class session to provide an example of what was expected in the primary literature discussion-based sessions.

In addition to the article-based sessions, the course incorporated 3 non-literature based sessions focused on various ambulatory care topics. These sessions consisted of motivational interviewing with role-playing patient counseling activities to mimic patient interactions, hands-on activities for providing patient counseling on various tools and devices commonly encountered in ambulatory care practice (ie, glucometers, syringes, inhalers, enoxaparin teaching kits, etc.), and a panel composed of various ambulatory care pharmacy practitioners (ie, clinical pharmacy specialists, medication therapy management specialists, ambulatory care pharmacy residents,

Table 2. Current Concepts in Adult Ambulatory Care Pharmacy Course Schedule

| Week | Topic | Instructor | Comments/Groups |
|---|---|---|---|
| 1 | Course Overview, Policies, and Procedures | Instructor 1 and 2 | |
| 2 | Diabetes: Oral Medications | Instructor 1 and 2 | |
| 3 | Smoking Cessation | Instructor 1 | Groups 1 and 2 |
| 4 | Diabetes: Insulin | Instructor 2 | Groups 3 and 4 |
| 5 | Asthma | Instructor 1 | Groups 5 and 6 |
| 6 | COPD | Instructor 2 | Groups 7 and 8 |
| 7 | Hypertension | Instructor 1 | Groups 9 and 10 |
| 8 | Motivational Interviewing and Role Playing Cases | Instructor 2 | |
| 9 | Ambulatory Care Pharmacy Careers and Residencies | Instructor 1 and 2 | *Pharmacist panel<br>*Student questions |
| 10 | Patient Counseling Activity | Instructor 1 | |
| 11 | Lipid Disorders | Instructor 2 | Groups 1 and 2 |
| 12 | Cardiovascular Risk Reduction | Instructor 1 | Groups 3 and 4 |
| 13 | Arterial Anticoagulation | Instructor 1 | Groups 5 and 6 |
| 14 | Venous Anticoagulation | Instructor 2 | Groups 7 and 8 |
| 15 | NO CLASS: Thanksgiving Break | | |
| 16 | Heart Failure | Instructor 2 | Groups 9 and 10 |

Table 3. Articles Discussed by Disease State

| Topic | Article 1 | Article 2 |
|---|---|---|
| Diabetes: Oral Medications | Bergenstal RM, et al. Efficacy and safety of exenatide once weekly versus sitagliptan or pioglitazone as an adjunct to metformin for treatment of type 2 diabetes (DURATION-2): a randomized trial. *Lancet.* 2010;376:431–439 | UK Prospective Diabetes Study Group. Effect of intensive blood-glucose control with metfomin on complications in overweight patients with type 2 diabetes (UKPDS 34). *Lancet.* 1998;352:854-865 |
| Smoking Cessation | Rigotti NA, et al. Efficacy and safety of varenicline for smoking cessation in patients with cardiovascular disease: A randomized trial. *Circulation.* 2010;121:221-229 | *Jorenby DE, et al.* A controlled trial of sustained-release bupropion, a nicotine patch, or both for smoking cessation. *N Engl J Med*. 1999;340:685-691 |
| Diabetes: Insulin | The Action to Control Cardiovascular Risk in Diabetes Group. Effects of intensive glucose lowering in type 2 diabetes. *N Engl J Med*. 2008;358:2545-2559 | Riddle MC, et al. Randomized addition of glargine or human NPH insulin to oral therapy in type 2 diabetic patients. *Diabetes Care*. 2003;26:3080–3086 |
| Asthma | Nelson HS, et al. The Salmeterol Multicenter Asthma Research Trial. *Chest*. 2006;129;15-26 | Bateman ED, et al. Can Guideline-defined Asthma Control Be Achieved? The Gaining Optimal Asthma Control Study. *Am J Respir Crit Care Med*. 2004;170:836–844 |
| COPD | Calverley PMA, et al. Salmeterol and fluticasone propionate and survival in chronic obstructive pulmonary disease. N Engl J Med 2007;356:775-89 | Vogelmeier C, et al. Tiotropium versus salmeterol for the prevention of exacerbations of COPD. N Engl J Med 2011;364:1093-103 |
| Hypertension | Jamerson K, et al. Benazepril plus amlodipine or hydrochlorothiazide for hypertension in high-risk patients. *N Engl J Med*. 2008;359:2417-28 | The ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs diuretic: The antihypertensive and lipid-lowering treatment to prevent heart attack trial *(ALLHAT) JAMA*. 2002;288(23):2981-2997 |
| Lipid Disorders | The AIM-HIGH Investigators. Niacin in patients with low HDL cholesterol levels receiving intensive statin therapy. *N Engl J Med*. 2011;365:2255-2267 | Ridker PM, et al. Rosuvastatin to prevent vascular events in men and women with elevated c-reactive protein. *N Engl J Med*. 2008;359:2195-2207 |
| Cardiovascular Risk Reduction | Schauer PR, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. *N Engl J Med*. 2012;366:1567-1576 | The Heart Outcomes Prevention Evaluation Study Investigators. Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients. *N Engl J Med*. 2000;342:145-153 |
| Arterial Anticoagulation | Wiviott SD, et al. Prasugrel versus clopidogrel in patients with acute coronary syndromes. *N Engl J Med*. 2007;357:2001-2015 | Wallentin L, et al. Ticagrelor versus clopidogrel in patients with acute coronary syndromes. *N Engl J Med*. 2009;361:1045-1057 |
| Venous Anticoagulation | The EINSTEIN Investigators. Rivaroxaban for symptomatic venous thromboembolism. *N Engl J Med*. 2010;363:2499-2510 | Connolly SJ, et al. Dabigatran versus warfarin in patients with atrial fibrillation. *N Engl J Med*. 2009;361:1139-1151 |
| Heart failure | Poole-Wilson PA, et al. Comparison of carvedilol and metoprolol on clinical outcomes in patients with chronic heart failure in the Carvedilol or Metoprolol European Trial (COMET): randomised controlled tiral. *Lancet*. 2003; 362: 7-13 | Pfeffer MA, et al. Effects of candesartan on mortality and morbidity in patients with chronic heart failure: the CHARM-Overall programme. *Lancet*. 2003 362: 759–766 |

community pharmacy-based academic fellows, etc.). This panel session was relatively informal, giving students an opportunity to ask questions to increase their understanding of the roles of ambulatory care pharmacists.

Student grades were determined by multiple activities, including evaluation of formal presentations of assigned articles, participation in, and moderation of, the Facebook group, class participation, quizzes on assigned readings, and creation of quiz questions. The majority of course points were for performance during oral presentations (150 of 380 points). An evaluation was developed specifically for Facebook group roles because this activity was so unique.[27] Overall Facebook participation accounted for the second largest portion of available points (100 of 380), followed by in-class participation (55 points) and in-class quizzes (50 points).

## EVALUATION AND ASSESSMENT

Course evaluations, quizzes on assigned readings, and evaluations of formal presentations provided the main forms of student evaluation and assessment. Course evaluations served as a qualitative assessment of student learning and perceptions, while quizzes were the most objective assessment of student learning, and presentation evaluations were the most directed assessment of the first course goal.

Course participants received a voluntary online evaluation to complete anonymously at the end of the 3 semesters the course was offered. Course coordinators chose to offer a small number of points for completing evaluations, which were standardized across the campus where the elective was offered. Seventy-four students completed the elective, and 67 students completed the course evaluations (71% response rate). Evaluations consisted of 8 Likert-scale items required by the university and an additional 10 Likert-scale items to evaluate specific course goals and objectives (Table 4). Due to a change in evaluation system used at the university, course-specific items were not included in the 2012 survey.

Results from course evaluations were overwhelmingly positive, with students rating the elective as "good" or "excellent" overall, 46.7% and 48.9% of students, respectively. The majority of students achieved the course learning objectives, with results indicating a self-perceived increase in the ability to identify relevant literature and guidelines to support or refute currently accepted practice in ambulatory care and an improvement in the ability to critically evaluate this literature. More than 60% of students each year felt that Facebook was successful in promoting a continual learning mindset. Evaluations showed that 81% of students each year expressed an increased interest in ambulatory care upon course completion. Additional data from course evaluations illustrated that students felt the course improved their ability to evaluate patient data and literature (100% of respondents), to provide evidence-based support for arguments, recommendations, and solutions (100% of respondents), and to effectively present information to colleagues regarding drug therapy topics (97.9% of respondents).

In addition to the standard course evaluations, a second anonymous online survey was administered at the start and end of the semester in 2012 and 2013 (Table 5). This survey, which was not validated nor used prior to this course, was intended to assess changes in perception and confidence following course participation and to more specifically assess the attainment of the primary course goals. Combining survey results from both years showed an improvement in multiple items, including how well students felt they kept up to date with pharmacy literature, how knowledgeable they felt about current topics in pharmacy practice, and how confident they were in their ability to discuss topics not formally addressed in the doctor of pharmacy curriculum with peers, faculty members, and other health care professionals. Items evaluating attitudes surrounding the use of Facebook in an academic setting did not show a change from the start of the semester to the end of the semester. Of the 50 students who completed the elective during 2012 and 2013, 49 students completed the presurvey (98% response rate) and 45 students completed the postsurvey (90% response rate).

Average quiz grades were 4.2, 4.1 and 4.5 out of 5 points per quiz, for years 2011, 2012, and 2013, respectively. These scores demonstrated adequate preparation of students prior to class (ie, reading assigned articles) and a baseline level of understanding of assigned readings. Average formal presentation grades were 67.6, 68.6, and 69 out of 75 points per presentation for years 2011, 2012, and 2013, respectively. Presentation scores above 90% ($\geq$67.5 out of 75 points) represented a high ability to apply information from their assigned clinical trials to practice, while providing further evidence of the achievement of the primary course goal.

## DISCUSSION

This elective was initially created to fill an unmet curricular need and incorporated innovative teaching techniques and concepts. Based on the evaluations received from the 3 offerings of the elective, the course accomplished what it set out to achieve. Overall, students reported an increased familiarity with primary literature that contributed to the development of current therapeutic guidelines and ambulatory care clinical decision-making

Table 4. Course Evaluation Responses

| **Overall, I would rate this course as. . . *** | **Excellent N (%)** | **Good N (%)** | **Fair N (%)** | **Poor N (%)** | **Very Poor N (%)** |
|---|---|---|---|---|---|
| | **22 (48.9) Strongly Agree N (%)** | **21 (46.7) Agree N (%)** | **2 (0.4) Undecided N (%)** | **0 Disagree N (%)** | **0 Strongly Disagree N (%)** |
| I understand the importance of this course for the profession of pharmacy.** | 45 (65.2) | 23 (33.3) | 1 (1.4) | 0 | 0 |
| The grading system was clearly stated.** | 43 (62.3) | 23 (33.3) | 1 (1.4) | 1 (1.4) | 1 (1.4) |
| Learning objectives for this course were clearly stated.** | 40 (58) | 26 (37.7) | 2 (2.9) | 1 (1.4) | 0 |
| Successful performance of this course required that I understand the material.+ | 25 (36.8) | 37 (54.4) | 1 (1.5) | 5 (7.4) | 0 |
| I got adequate feedback on examinations so that I can understand the questions I missed.+ | 27 (39.7) | 29 (42.6) | 10 (14.7) | 1 (1.5) | 1 (1.5) |
| The topics in this course were well integrated.+ | 41 (60.3) | 25 (36.8) | 2 (2.9) | 0 | 0 |
| This course required me to engage in independent learning of material not explicitly covered in class.** | 32 (46.4) | 30 (43.5) | 3 (4.3) | 4 (5.8) | 0 |
| The course was enhanced by using the Facebook group.++ | 12 (25) | 21 (43.8) | 7 (14.6) | 5 (10.4) | 3 (6.3) |
| The use of the Facebook group promoted a continual learning mindset for me.^ | 16 (34) | 18 (38.3) | 5 (10.6) | 5 (10.6) | 3 (6.4) |
| The amount of time spent in the Facebook group outside of class was appropriate.++ | 10 (20.8) | 21 (43.8) | 8 (16.7) | 6 (12.5) | 3 (6.3) |
| I would encourage a current P2 student to take this course.++ | 23 (47.9) | 20 (41.7) | 3 (6.3) | 2 (4.2) | 0 |
| This course increased my interest in ambulatory care pharmacy.++ | 16 (33.3) | 23 (47.9) | 8 (16.7) | 1 (2.1) | 0 |
| I believe this course improved my ability to critically evaluate patient data, literature sources, and drug products.^ | 30 (63.8) | 17 (36.2) | 0 | 0 | 0 |
| I believe this course improved my ability to provide evidence-based support for arguments, recommendations, and solutions.++ | 29 (60.4) | 19 (39.6) | 0 | 0 | 0 |
| I believe this course allowed me to effectively present information to colleagues, other health care practitioners, and general public, regarding drug therapy and related topics.++ | 22 (45.8) | 25 (52.1) | 1 (2.1) | 0 | 0 |
| I believe this course allowed me to acquire new information to answer specific questions from patients, colleagues, and other health care professionals.^ | 21 (44.7) | 24 (51.1) | 2 (4.3) | 0 | 0 |
| I believe this course allowed me to display self-directed learning, having acquired the necessary knowledge and skills to develop and maintain my competence in providing optimal pharmaceutical care as a template for life-long learning and continued professional development.++ | 24 (50) | 24 (50) | 0 | 0 | 0 |

*n=45; **n=69; +n=68; ++n=48; ^n=47

Table 5. Student Presemester and Postsemester Self-evaluation

| | Preelective N (%) | Postelective N (%) |
|---|---|---|
| How well do you feel you stay up to date with current information in pharmacy practice? | | |
| Excellent | 0 | 2 (4.4)** |
| Good | 0 | 13 (28.9)** |
| Fair | 13 (26.5)* | 20 (44.4)** |
| Poor | 22 (44.9)* | 10 (22.2)** |
| Very Poor | 14 (28.6)* | 0 |
| How confident do you feel being able to locate new information relevant to pharmacy practice? | | |
| Extremely confident | 0 | 2 (4.7)$^{+}$ |
| Very confident | 7 (14.3)* | 31 (72.1)$^{+}$ |
| Moderately confident | 30 (61.2)* | 10 (23.3)$^{+}$ |
| Not very confident | 12 (24.5)* | 0 |
| Not at all confident | 0 | 0 |
| How would you rate your current knowledge of new topics relating to current pharmacy practice? | | |
| Excellent | 0 | 3 (6.8)$^{++}$ |
| Good | 2 (4.1)* | 12 (27.3)$^{++}$ |
| Fair | 7 (14.3)* | 23 (52.3)$^{++}$ |
| Poor | 32 (65.3)* | 6 (13.6)$^{++}$ |
| Very Poor | 8 (16.3)* | 0 |
| How motivated do you currently feel to stay up to date with current pharmacy information, outside of what is discussed in doctor of pharmacy courses (ie, information presented in medical websites, newsletters, and journals)? | | |
| Extremely motivated | 1 (2)* | 4 (8.9)** |
| Very motivated | 7 (14.3)* | 19 (42.2)** |
| Moderately motivated | 27 (55.1)* | 21 (46.7)** |
| Not very motivated | 14 (28.6)* | 1 (2.2)** |
| Not at all motivated | 0 | 0 |
| How confident do you feel in your ability to interpret current pharmacy information presented outside of the doctor of pharmacy curriculum? | | |
| Extremely confident | 0 | 4 (9.1)$^{++}$ |
| Very confident | 3 (6.1)* | 24 (54.5)$^{++}$ |
| Moderately confident | 37 (75.5)* | 16 (36.4)$^{++}$ |
| Not very confident | 9 (18.4)* | 0 |
| Not at all confident | 0 | 0 |
| How confident do you feel discussing new information in pharmacy practice that is not covered in the doctor of pharmacy curriculum with your student peers? | | |
| Extremely confident | 0 | 5 (11.1)** |
| Very confident | 5 (10.2)* | 24 (53.3)** |
| Moderately confident | 28 (57.1)* | 15 (33.3)** |
| Not very confident | 16 (32.7)* | 1 (2.2)** |
| Not at all confident | 0 | 0 |
| How confident do you feel discussing new information in pharmacy practice that is not covered in the doctor of pharmacy curriculum with College of Pharmacy faculty members? | | |
| Extremely confident | 0 | 1 (2.2)** |
| Very confident | 1 (2)* | 14 (13.1)** |
| Moderately confident | 13 (26.5)* | 26 (57.8)** |
| Not very confident | 28 (57.1)* | 4 (8.9)** |
| Not at all confident | 7 (14.3)* | 0 |
| How confident do you feel discussing new information in pharmacy practice that is not covered in the doctor of pharmacy curriculum with other health care professionals (ie, physicians, work colleagues, etc.)? | | |
| Extremely confident | 0 | 1 (2.2)** |
| Very confident | 1 (2.2)* | 12 (28.9)** |
| Moderately confident | 13 (26.5)* | 28 (62.2)** |

(*Continued*)

Table 5. (*Continued*)

| | Preelective N (%) | Postelective N (%) |
|---|---|---|
| Not very confident | 31 (63.3)* | 3 (6.7)** |
| Not at all confident | 6 (12.2)* | 0 |
| What is your opinion on the use of Facebook as an educational medium for discussing current information in pharmacy practice? | | |
| Strongly in favor | 1 (2)* | 2 (4.5)$^{++}$ |
| In favor | 18 (36.7)* | 20 (44.4)$^{++}$ |
| Neither for or against | 25 (51)* | 17 (37.8)$^{++}$ |
| Against | 3 (6.7)* | 4 (8.9)$^{++}$ |
| Strongly against it | 2 (4.1)* | 1 (2.2)$^{++}$ |
| How well do you feel Facebook can facilitate academic learning? | | |
| Extremely helpful | 1 (2)* | 2 (4.4)** |
| Very helpful | 10 (20.4)* | 12 (26.7)** |
| Moderately helpful | 30 (61.2)* | 26 (57.8)** |
| Not very helpful | 7 (14.3)* | 4 (8.9)** |
| Not at all helpful | 1 (2)* | 1 (2.2)** |
| How interested are you in discussing new information related to pharmacy practice on Facebook? | | |
| Extremely interested | 0 | 3 (6.7)** |
| Very interested | 15 (30.6)* | 11 (24.4)** |
| Moderately interested | 24 (49)* | 20 (44.4)** |
| Not very interested | 6 (12.2)* | 7 (15.6)** |
| Not at all interested | 4 (8.2)* | 4 (8.9)** |
| How knowledgeable do you feel about the role of, and opportunities available to, ambulatory care pharmacists in practice? | | |
| Extremely knowledgeable | 0 | 4 (8.9)** |
| Very knowledgeable | 3 (6.1)* | 23 (51.1)** |
| Moderately knowledgeable | 23 (46.9)* | 18 (40)** |
| Not very knowledgeable | 21 (42.9)* | 0 |
| Not at all knowledgeable | 2 (4.1)* | 0 |

*n=49; **n=45; $^{+}$n=43; $^{++}$n=44

processes, an improved feeling of confidence when discussing self-identified pharmacy information with peers and other health care professionals, and an increased motivation to stay up to date with current pharmacy information outside the didactic curriculum. Activities were designed based on the course objectives, with a stronger emphasis on advanced clinical information rather than didactic pharmacotherapeutic learning. As a result, there were limited direct measures of learning, with the most direct being preclass quiz scores. The high average quiz scores achieved each year indicated adequate preparation for class with an appropriate baseline understanding of the assigned readings. The high mean presentation scores most directly illustrated achievement of the primary course goal focusing on the clinical application of primary literature.

While students may not have been completely satisfied with the use of Facebook as the mode of encouraging continual learning, survey results supported the achievement of promoting a continual learning mindset outside the classroom. Other studies that assessed the use of Facebook as an educational tool found conflicting results, with some studies reporting a high level of satisfaction[28,29] and others reporting dissatisfaction with the use of Facebook for educational purposes.[30,31] New technology and uses for technology continue to be developed and incorporated into teaching methodologies, often in ways that students have not previously experienced. No other course within the college of pharmacy where this elective was offered utilized Facebook as a required course component, and limited literature was identified describing use of Facebook in a similar manner. As a result, students may be somewhat resistant to this method until the use of social media and other technology for educational purposes becomes more mainstream and widely accepted. The course coordinators intend to continue using Facebook as a component of the course.

The design of this elective could be easily implemented at other colleges and schools of pharmacy wishing to focus on ambulatory care practice, or other areas of specialty pharmacy practice, without adding significant teaching hours. The use of a learner-centered instruction technique for the article-based classes spared course faculty members from developing formal lectures on those topics. Similarly, traditional lecture-based didactic teaching of those topics was already completed in the

pharmacotherapeutics sequence of the core curriculum. Once topics and articles were identified, minimal faculty member time was required outside of the 2-hour class session each week. The largest time commitment between course offerings was ensuring selected literature articles were still relevant and worthwhile to include in the article-based discussion sessions. Making the weekly quizzes, coordinating the ambulatory care practitioner panel, keeping the course website up to date, and evaluating student activity in the Facebook group encompassed the largest remaining time commitment outside of class.

While this elective met many of the CAPE 2013 Outcomes,[6] only a small percentage of the students enrolled in the doctor of pharmacy curriculum were able to take the course. Course faculty members limited enrollment to 25-30 students per semester. Enrollment limits were necessary because the classrooms available had physical limitations and because the course developers wanted to provide an environment conducive to group discussion and active engagement. This elective was designed and offered at a college of pharmacy located at a single campus, but the design could easily be adapted to fit the needs of multi-campus schools. Ideally, a course co-coordinator would be located on each campus to help facilitate discussions, with all presentations and discussions conducted via videoconferencing technology. The student-led presentations could easily be conducted via videoconference with real-time interaction across multiple campuses. The use of social media could facilitate communication among students at multiple campuses as well. The course was initially offered once each year so course coordinators could maintain their respective clinical practices and other didactic responsibilities. We are, however, considering offering the course twice per year so more students can be exposed to the ambulatory care content.

Free text responses in the course evaluations allowed students to provide comments regarding aspects of the course they liked or improvements they felt the course needed. Based on evaluation responses and student feedback, changes were made for each subsequent offering. For example, students commented during the first offering that they were having trouble identifying the specific articles used in the article-based classes, as many of the articles also had multiple editorials or study arms published under similar names. To address this, starting in 2012, the course syllabus included the journal title and publication year to help students identify the correct articles. Students also suggested more continuity between instructors to facilitate more consistent presentation grading. For the second and third offerings, 2 course coordinators were the only faculty members present to facilitate class discussions, rather than involving additional faculty members as had been done during the first offering. Students also requested more guidance on the expected time commitment of the Facebook group outside of class. The syllabus was updated for the second and third offerings accordingly.

Future offerings of the course will continue to be modified based on student feedback and coordinator experience. Goals, learning objectives, and course evaluations will be modified to more directly correlate to each other for a more complete assessment of the elective. Additionally, course coordinators are reevaluating the way Facebook can be used to promote a continual learning mindset outside of the classroom. For example, it is likely that the Facebook component of the course will represent a smaller portion of points and include clearer expectations for students acting as Facebook moderators—changes resulting from student feedback. Based on class performance during the last 3 semesters, another large change will likely be an adjustment of the evaluation for the article-based presentations. The presentation grading rubric will be updated to ensure focus on appropriate application of the article to clinical practice, with a larger percentage of available points dedicated to this aspect, rather than the technical aspects of the article itself.

## SUMMARY

The elective described in this paper was an innovative and unique approach to teaching ambulatory care concepts to P3 students. It effectively filled a curricular void, while addressing various CAPE 2013 Outcomes.[6] Successful attainment of the 2 primary course goals, increased student ability to apply relevant concepts from primary literature to clinical practice and the promotion of a continual learning mindset outside the classroom, was demonstrated through course evaluations, surveys, preclass quiz scores, and presentation scores.

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